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ABSTRACT

This study investigated the effects of phonological processing on vocabulary development of learners of English as a Second Language. A list of 30 relatively unfamiliar academic English words of from 1-4 syllables was developed. A control group of 28 subjects, first-year students in a University of Hong Kong English enhancement course, were given 15 minutes to study the words, then asked to reproduce them both in writing and orally. A similar experimental group was given the list in a language laboratory and could hear the words pronounced on tape. Both groups were then given the list of words in random order and asked to match them with a contextualized meaning and Chinese translation. After this, subjects were asked to pronounce the target words or parts that they could remember. Subjects repeated the recall exercise a week later. Results indicate no significant difference between the two groups on written early recall, but the control group recalled significantly less after a week. The control group generally produced more accurate spelling. In oral recall, the experimental group produced 70 percent more correct words than the control group in early recall and 54 percent more in later recall, confirming that the phonological dimension improves learners' overall vocabulary learning ability. Contains 11 references. Wordlists used in the study are appended. (MSE)

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# A WORD IN YOUR EAR: TO WHAT EXTENT DOES HEARING A NEW WORD HELP LEARNERS TO REMEMBER IT?

MONICA HILL

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# A WORD IN YOUR EAR: TO WHAT EXTENT DOES HEARING A NEW WORD HELP LEARNERS TO REMEMBER IT?

*Monica Hill*

One of the major differences between the English language needs of secondary and tertiary students in Hong Kong lies in the substantial vocabulary learning load faced by students at the start of an undergraduate degree course. A first year undergraduate faces the task of learning new subject specific vocabulary, as well as the general academic vocabulary which forms an essential part of academic discourse (cf. Laufer 1988 and 1992). An interesting question is how such students cope with absorbing this vast new quantity of words. Many rely on guessing the meanings from context, while others tend to check the meanings in either English-Cantonese dictionaries or, in a few cases, in monolingual dictionaries (Bensoussan and Laufer 1984). Once they have learned, or partially learned, a new word, students often try to use it again either in their written assignments, or in discussions and oral presentations in class, with varying degrees of success.

A related problem is that students are often unable to reproduce a 'new' word orally as they are unsure of its pronunciation. Some students are able to read the phonemic transcription of a new word in its dictionary entry, and reproduce it with reasonable accuracy. Many others, however, either do not understand the system of phonemic transcription, or do not bother to look at the transcription (Piczon-Llamzon 1979). These students in particular have a great deal of difficulty with oral reproduction of new words and are particularly prone to errors in word stress. Irregular pronunciation such as / krɪ'eɪʧə / for creature, / ekstra'vəgənt / for extravagant / 'meɪʧə / for mature and /məna'gəmɪ/ for monogamy illustrate some of the phonological difficulties which Hong Kong tertiary students face with partially learned words. (McNeill 1990). This suggests that the phonological dimension of word learning is not, or is only partially covered. In the Hong Kong education system, relatively little attention is paid to the teaching of pronunciation, which means that such errors are widespread and pass largely undetected. Obviously, this lack of phonological awareness on the part of ESL students is not really apparent in their written work, where they are generally able to produce correct word forms. Lexical errors in writing tend to be semantic in nature or involve incorrect collocation.

An additional factor which needs to be taken into account in an investigation of Cantonese-speaking students' difficulties with English vocabulary is the effect of word length. Given that Chinese contains many one character words, a reasonable hypothesis might be that native speakers of Cantonese find it more difficult to remember and reproduce English words of more than one syllable. In fact, Chinese words do not necessarily consist of only one character and one morpheme: they can consist of a combination of polymorphemic characters which range from two to eight morpheme characters in length. As each of these polymorphemic Chinese words is made up of a series of semantic clues, learners may have more contextual

information, or inhibition, to help them learn such words. (See Sun, this volume.) In the present study, comparisons are made to ascertain whether or not students encounter more problems over learning longer English words rather than shorter ones.

The purpose of this paper is to report the results of a study carried out at the University of Hong Kong which tried to identify the effects of phonological processing on first year students attending English enhancement courses in the English Centre. The first part (Preliminary Study) aims to identify a set of academic vocabulary items which are unfamiliar to the population from which the sample of subjects is drawn. The second part (Main Study) is experimental and investigates the learning of new vocabulary under different conditions.

**Research Questions**

The study addresses two questions:

1. Do learners who can read the phonemic transcription in dictionary entries have any advantage in their learning of new vocabulary?

2. Do learners who hear new words as well as see them have an advantage over learners who only have access to the written form?

**Hypotheses**

In attempting to answer the above questions the following three hypotheses are tested:

1. Phonological processing * of new vocabulary improves learners' overall ability to learn new words.

2. Phonological processing at the initial learning stage improves learners' ability to produce new words in writing and in speech.

3. In view of the polymorphemic structure of Chinese words, long English words will be more difficult to learn than short words. **

* For the purpose of the study, phonological processing includes either the hearing of the new word or the phonological decoding of a written word form using phonemic transcription.

** For the purpose of the study a long word is defined as a word which consists of three or more syllables and a short word is defined as consisting of one or two syllables.

**Design of Study**

The study is divided into two phases: The aim of the preliminary study was to identify a set of academic words which were largely unknown to the subjects, while the main study set out to examine the effect of phonological processing on Cantonese-speaking learners of new English words.

**Preliminary Study: Identifying a set of target words**

Based on a University Word List (Nation 1990), a list of approximately 250 words was circulated to a target sample of 58 students from the Arts and Social Sciences Faculties. They were asked to delete any words whose meanings they knew and to mark those words which they had not previously encountered. (Words were considered 'known' if a student recognised the form and could reproduce the meaning in his/her own language.) The students returned all the papers and were advised not to try to memorize any of the words or look them up in dictionaries as they would be given the word lists again at a later date, if they so wished. The results of the survey varied considerably, and only five words were claimed to be completely unknown in the subjects' self reports. Subsequent objective testing showed that their claims of word knowledge had been exaggerated. The 45 least frequently known words were extracted and isolated to form the basis of the pre-test. (See Appendix 1)

The group of words was further revised according to syllabic length and produced a list of 30 words in the following patterns:

1. 7 words of 1 syllable
2. 8 words of 2 syllables
3. 7 words of 3 syllables
4. 8 words of 4 or more syllables.

**Main Study**

To further ensure that the words used in the experiment were actually new to the subjects, a pre-test was used. Each subject was given a sheet showing the original 45 least frequently known words and was asked, if possible, to write the L1 translation or give an L2 equivalent. If they did not know the word, they were asked to leave a blank.

They were asked to give their names, class and 'Use of English' A level result, where appropriate, so that a closer analysis of the findings might be made. In this way, the subjects were not immediately shown the 30 target words, but were gradually introduced to the level of words to be learned.

**Study Phase**

Three dimensions of word knowledge, identified by Aitchison (1987) as semantic, syntactic and phonological, have all been reflected in the experiment and are described in Figure 1.

**Figure 1**

**Elements of the Presentation Materials**

| Dimension of word knowledge | Operationalisation in presentation materials |
|---|---|
| semantic<br>syntactic<br>phonological | L1 translation<br>use in context<br>phonemic transciption and aural element on tape |

The words were first listed in alphabetical order. To replicate the methods currently used by the students to learn new words, the lists showed the following:

**Figure 2**

**Example of New Word Explanation Used in Study Phase**

| Word in English (L2) phonemic transcription | (Chinese) L1 translation | Monolingual (L2) dictionary explanation (i.e. word in context) |
|---|---|---|
| auspices<br>/ˈɔspisiz /<br>[illegible] | 贊助 | The conference was held under the auspices of the United Nations. |

The Chinese translation was taken from *Longman's Active Study English - Chinese Dictionary (1991)* and the monolingual explanation (i.e. contextualised meanings) from *Collins Cobuild Dictionary*. An additional ingredient was added to give more authenticity to the exercise of replicating the students' dictionary search: namely the phonemic script, as shown in Longman's Active Study Dictionary. This also helped to balance out the phonological element of the other half of the experiment. In this way, the students were able to see the target words and their pronunciation, have the translation in L1 and the word used in context in L2. The Chinese translations were kindly transcribed by Mr K.K. Chan of the Language Centre, University of Hong Kong.

The dictionary explanations chosen generally reflected the most academic meanings, for example, 'gem' as in '... a gem of wisdom...' rather than 'a precious stone'. Slight changes were made, for example, to alter plural nouns to singular ones, as in 'these anomalies' - 'this anomaly' to remove unnecessary obstacles to the subsequent reproduction of the target word.

The students were given fifteen minutes to study the 30 words which had been selected according to word length before being asked to reproduce them both in writing and orally. To enhance the phonological dimension of word learning, the experimental group was given the same word study sheets but their experiment was conducted in the language laboratory and they were able to hear the target words pronounced on tape. They were allowed to listen to the tape as often as they wished and were able to repeat the words silently or aloud as they wished. The time limit of fifteen minutes was the same for all subjects.

**Productive Phase**

The target words were listed in random order so that students were not able to rely on recalling the words in the same order as originally presented. In the random arrangement, the lengths of words as well as their initial letters were varied. The subjects were given the contextualised meaning with a gap for the target word, plus the Chinese translation and were required to produce the target word. They were asked to give any words, or any parts of the words they could remember and were advised that immediately after the written test, they would be asked to record on tape the target words, or the parts that they could remember. The aim of this was to distinguish more accurately between the effects of aural and visual dimensions of pronunciation.

To ascertain the extent of the subjects' knowledge of phonemic script, they were given a short questionnaire. The purpose here was to help identify those who used their previous knowledge of phonemic transcription and those who disregarded or were unable to use this information in the test.

Both groups were asked to repeat the recall phase a week later. This helped identify the words which were remembered in both mid- and long-term memory (referred to here as tests 1 and 2).

**General English standard of the subjects**

A total of 56 students from the Arts and Social Sciences faculties took part in the experiment, with 28 in each group. By calculating the mean Use of English grades of the subjects, both the control and experimental groups were evenly balanced at C6. The lowest level accepted for admission to the University of Hong Kong is D8, with A1 as the highest grade on the scale, so these were fairly average first year tertiary students.

**Results and Discussion**

**Results of the Pre-test**

Both the experimental and control groups were fairly evenly balanced in terms of their familiarity with the target words. The mean number of known words was 1.0 in the experimental group and 1.7 in the control group. In many cases, however, the correct answer in the pre-test appears to be an inspired guess as the wrong answer was produced in the subsequent tests. For this reason, the apparent number of known words is noted in the data, but not deducted from the final scores as it does not necessarily reflect an accurate picture of the subject's familiarity with the word.

**Results of Main Study**

The answers to both the short-term and the long-term tests were entered on to a database (FileMaker Pro) and evaluated. Spelling mistakes counted as errors, but third person 's' or past tense forms e.g. 'pervades' or 'pervaded' for 'pervade' were accepted if they were contextually and grammatically appropriate, while 'auspice' was incorrect as only the plural form 'auspices' is used.

In general, there was no significant difference between the two groups in the written form mid-term recall (Table 1). However, the difference between the mid-term and long-term recall produced a decrease of 27.6% for the experimental group and 32.3% for the control group. The difference in the scores of the Control and Experimental groups on Test 2 (long-term retention) is statistically significant ($t = 2.33$, $p<.05$). The addition of the sound dimension, therefore, appears to have been an advantage for the experimental group in the overall long-term recall.

**Written recall**

Figure 3

**Written Recall Scores**

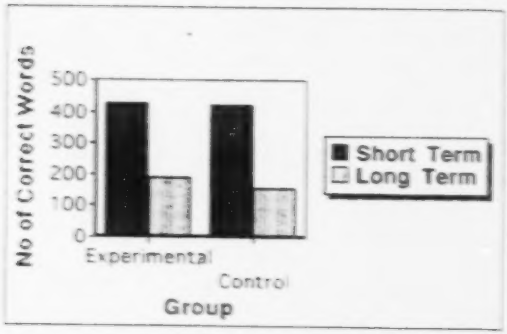



Table 1

**Written Recall Scores**

| | Experimental (n = 28) | | Control (n = 28) | | Notes |
|---|---|---|---|---|---|
| | mean (/840) | % | mean (/840) | % | |
| Test 1 (mid-term) | 428 | 50.1 | 424 | 50.5 | (t = n.s.) |
| Test 2 (long term) | 189 | 22.5 | 153 | 18.2 | (t = 2.33, p<.05) |

**Spelling Errors**

The control group generally produced more accurate spelling as their words seemed to have been produced from visual memory, resulting in fairly high scores on the written tests. The experimental groups appear to suffer from less accurate spelling with common errors being:

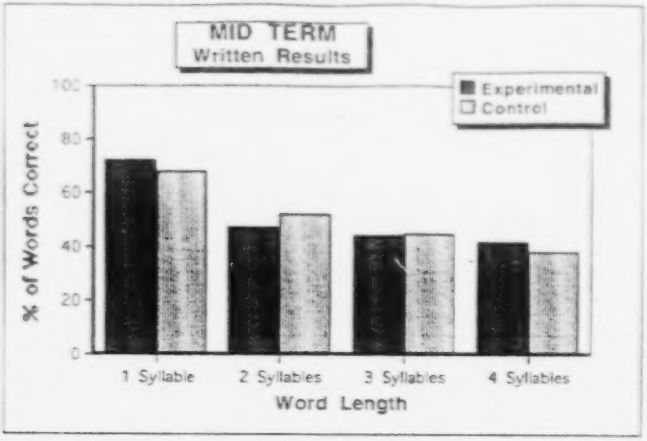
'super**cil**lious', 'amo**ph**rous', 'rever**br**ate' and '**pr**evade'

Perhaps this accuracy of spelling in the control groups reflects the Chinese skills of character recognition and memory, as, in initial learning of Chinese characters, they are taught to recognise them visually at school. Those in the control groups tended to write down the words on their sheets as if writing them helped to recall them visually while those in the experimental groups tended to repeat the words quietly to themselves. The additional input of sound in the experimental group seemed to cause them a degree of difficulty, perhaps because the greater input of information was more difficult to 'digest', resulting in less accurate reproduction of the target words. Another explanation of the loss of written accuracy in the Experimental group is that the aural mode of presentation was unfamiliar to them and may have interfered with their usual word learning processes.

Closer analysis of the mid-term written results reveals the following:

**Figure 4**

**Test 1 (mid-term)**
**Written Recall By Word Length**




The hypothesis that Chinese-speaking learners would find long words more difficult to learn than short words was confirmed: 180 long words compared to 248 short words were recalled by the experimental group and 174 long words compared to 250 short words by the control group (Table 2).

Table 2

**Test 1 (mid term)**
**Written Recall by Word Length**

| | Experimental (n = 28) | | Control (n = 28) | | Notes |
|---|---|---|---|---|---|
| | mean (*/196 **/224) | % | mean (*/196 **/224) | % | |
| 1 syllable* | 142 | 72.6 | 133 | 76.9 } | (t = n.s.) |
| 2 syllables** | 106 | 47.3 | 117 | 52.2 } | |
| 3 syllables* | 87 | 44.3 | 89 | 45.4 } | |
| 4 syllables** | 93 | 41.5 | 85 | 37.9 } | |

There was no significant difference between the experimental and control groups when the data was analyzed by word length, although the experimental group did slightly better on words of 1 and 4 syllables while the control group took a slight lead in words of 2 and 3 syllables. Surprisingly, the experimental group found 3 syllable words the most difficult to recall in the mid-term.

In the long-term, however, this pattern changed slightly.

Figure 5

**Test 2 (long term)**
**Written Recall By Word Length**

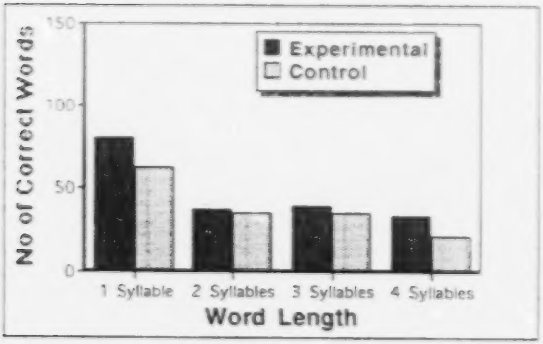


Table 3

Test 2 (long term)
Written Recall By Word Length

| | Experimental (n = 28) | | Control (n = 28) | | Notes |
|---|---|---|---|---|---|
| | mean (*/196 **/224) | % | mean (*/196 **/224) | % | |
| 1 syllable* | 80 | 40.8 | 62 | 31.6 | n.s. |
| 2 syllables** | 37 | 16.5 | 35 | 15.6 | n.s. |
| 3 syllables* | 39 | 19.9 | 35 | 17.9 | n.s. |
| 4 syllables** | 33 | 14.7 | 21 | 9.4 | (t = 2.8, p<.05) |

The experimental group outperformed the control group in all categories of word length. Short words (1 syllable) were recalled twice as frequently as the longer ones. With the words of 4 syllables, however, in long-term recall, t-tests showed a significant difference with a t-value of 2.18 ($p<0.05$).

**Oral recall**

In this area the difference between the two groups' results proved significant.

Figure 6

Oral Recall Scores

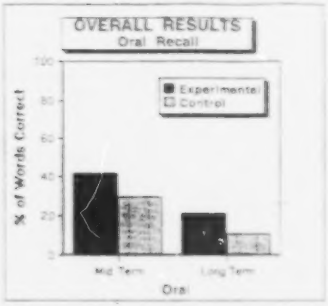


**Table 4**

**Oral Recall Scores**

| | Experimental (n = 28) | | Control (n = 28) | | Notes |
|---|---|---|---|---|---|
| | mean (/840) | % | mean (/840) | % | |
| Test 1 (mid-term) | 354 | 42.1 | 250 | 29.8 | (t=2.81, p<.05) |
| Test 2 (long term) | 178 | 21.2 | 96 | 11.4 | (t=4.25, p<.01) |

The variation between mid-term and long-term recall was a decrease of 50% for the experimental groups and 38.4% for the control groups, which was slightly less than the drop for written recall. A comparison of the two groups' results in Test 2 (Oral Recall) reveals a highly significant difference (t=10.92, p<.01).

The experimental group produced 70% more correct words in the mid-term and 54% more in the long-term, again confirming that the phonological dimension improves learners' overall ability to learn new words.

Closer analysis of the oral results shows the following:

**Figure 7**

**Test 1 (mid term)**
**Oral Recall By Word Length**

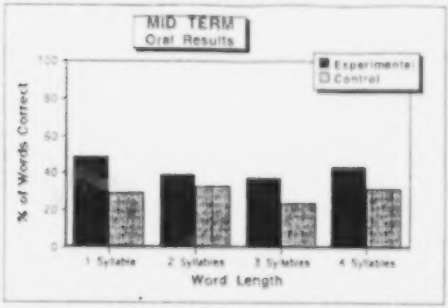


Table 5

**Test 1 (mid term)**
**Oral Recall By Word Length**

| | Experimental (n = 28) | | Control (n = 28) | | Notes |
|---|---|---|---|---|---|
| | mean (*/196 **/224) | % | mean (*/196 **/224) | % | |
| 1 syllable* | 96 | 49.0 | 57 | 29.1 | t=3.92, p<01 |
| 2 syllables** | 88 | 39.3 | 74 | 33.0 | n.s. |
| 3 syllables* | 73 | 37.2 | 47 | 24.0 | t=2.34, p<.05 |
| 4 syllables** | 97 | 43.3 | 72 | 32.1 | t=2.03, p<.05 |

Contrary to the written results, the experimental group found words of 1 and 4 syllables easier to recall orally than those of 2 and 3 syllables (Table 5). The control group had significantly more difficulty in oral recall in all word lengths, not having heard the words pronounced on tape, and/or ignoring the phonemic transcription given on the sheets.

These subjects often had no idea how to say words such as 'beige' and 'niche', perhaps as the words looked unusual as well as unfamiliar. Some students simply omitted to 'read' these words on to tape, completely ignoring the answers they had written on their sheets, while others said, 'Don't know how to pronounce!' or spelled out the words, e.g. 'b-e-i-g-e'.

An interesting phenomenon which emerged in the subjects' oral production of longer words was the tendency to add an extra syllable to the word, e.g. /ə məˈfəs / frequently became / ə məˈfərəs /. Although the longer 4 syllable words were not so easily recalled overall, they did not pose such a relatively great problem in spoken form.

**Long-term oral results**

Here the effect of the phonological processing on the experimental group was clearly discernable. Those who had heard the pronunciation of the words did significantly better in the oral recall than those who had not. Again the disparity was clearest in words of 1 syllable, as those who had not received aural clues were unable to pronounce correctly short words like 'gem', 'chore', 'beige', 'niche' or 'fraud'. These were most commonly recorded as /gem/, /kɔ:/, /biːdʒ/, /niːʃ/ and /frɔːd/.

Closer analysis shows the following:

**Figure 8**

**Test 1 (long term)**
**Oral Recall By Word Length**

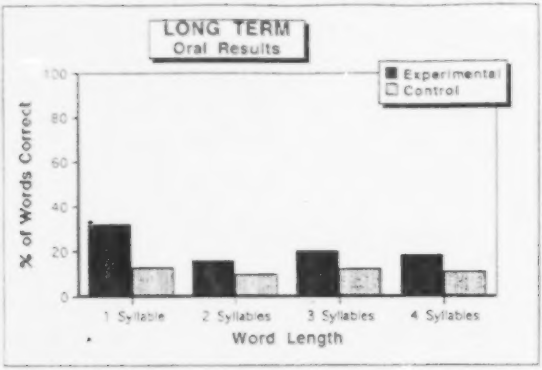



**Table 6**

**Test 1 (mid term)**
**Oral Recall By Word Length**

| | Experimental (n = 28) | | Control (n = 28) | | Notes |
|---|---|---|---|---|---|
| | mean (*/196 **/224) | % | mean (*/196 **/224) | % | |
| 1 syllable* | 63 | 32.1 | 26 | 13.3 | t=4.24, p<.0 |
| 2 syllables** | 36 | 16.1 | 22 | 9.8 | t=2.97, p<.05 |
| 3 syllables* | 39 | 19.9 | 24 | 12.2 | t=2.65, p<01 |
| 4 syllables** | 40 | 17.9 | 24 | 10.7 | t=2.64, p<01 |

The experimental group recalled short words more easily than long words, while there was no significance in the length of words recalled by the control group. Given the very low figures involved with the latter group, this is probably not a significant feature.

## Conclusions

Although the number of words recalled in the long-term is rather low, the experiment has been able to test the effect of the phonological dimension on word learning and has shown that the sound dimension has considerable impact on learning new words, particularly on oral recall.

It has also shown that Chinese-speaking students do generally have more difficulty in learning longer words, although they often compensate by giving such words more attention, particularly in their written form. Longer words do not, however, pose such a problem in oral reproduction as they can often be broken down into smaller component parts and can involve fewer problems with stress.

## Recommendations

Follow up work should examine the molecular breakdown of the syllables recalled. This may show which parts of the words are most frequently recalled, e.g. initial sound / medial / or final sound and in which combinations.

The results suggest that further studies should be considered to assess the importance of:

1. overt teaching of phonemic transcription on vocabulary learning from dictionaries and its effects on the pronunciation of words

2. increased phonological processing, such as ensuring that all subjects pronounce the words as they are learning them

3. 'talking' dictionaries and computer programmes which have 'real sound' as opposed to digitized voice reproduction, and their effect on vocabulary learning.

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**Appendix 1**

Wordlist used in the study

| | |
|---|---|
| allude | interlude* |
| amorphous | kindred |
| anomaly | litigate |
| ascribe* | niche |
| assent* | partisan |
| auspices | perpetrate |
| averse* | pertinent |
| beige | pervade |
| chore | procure |
| cogent | propensity |
| confer* | purport |
| construe | recur* |
| contingent* | repudiate |
| cumbersome* | reverberate |
| detriment* | rudimentary |
| discern* | squint |
| emaciate | stipulate* |
| fraud | suffice |
| gem | supercilious |
| hunch | unduly |
| incessant* | upsurge* |
| ingenious* | wrench* |
| ingenuous | |

All these words were used in the pre-test, in order to identify which, if any, were known to the students.

*These words were not used in the main study.